

Statement of Teaching Philosophy

I was educated in Taiwan through undergraduate school, and came to the United States for graduate studies afterwards. During graduate school, I had many opportunities to be a teaching assistant (TA), including TA for classes that require me to teach the discussion sections, in which I was the only instructor (i.e., no professors). For several classes, I had complete freedom to construct my own teaching material and homework. Furthermore, I mentored many undergraduate interns at Goddard, and have given many introductory talks for the interns.

The Taiwanese education is generally more strict, in which students are usually listeners, and few discussions are involved in the classrooms. Although my education in Taiwan provided me a robust training in many fundamental tools in science, it also made me understand, especially after experiencing a very different education culture in the United States, how important it is to provide an environment in class that encourages independent thinking and discussions, and how much more interesting and effective a class can be when including proper activities and interactions.

Because of these experiences, I am a strong believer that at the college level, learning should be something that is motivated, instead of enforced. That is, students are not there because they have to be there, but because they want to. Of course, different students have different level of interests in a particular subject. However, I believe that curiosity is fundamentally shared among humans, and this should be especially true for students who choose to attend college. Thus, good instructors are those who can trigger students' curiosity about the specific subject, and keep students motivated and engaged.

I also believe that a key element in keeping students motivated and engaged is that the instructor him/herself is enthusiastic about the subject. In addition to the fact that physics and astronomy are exciting by nature, I consider myself a very enthusiastic instructor. I enjoy interacting with students and explaining physics and astronomy concepts. As I believe in the phrase "if you can't explain it simply, you don't understand it well enough", teaching is always an excellent way for me to learn the subject more deeply and thoroughly, and also provides an opportunity for me to take a step back from some detailed problems in my research and see the big picture. Furthermore, I am always amazed by students' questions. Coming with a fresh mind, students often ask questions from a unique point of view, which a lot of time are creative and insightful, and help me think of the same problems from different angles. Therefore, I see teaching as a mutual way of learning.

Practically, being enthusiastic is not enough to deliver a clear, effective, and inspiring class. Based on my own learning and teaching experiences, I found that the following approaches are usually effective in terms of making the context clear, and keeping students motivated and engaged:

1. Practical examples or tools for visualization: many concepts in physics and astronomy are rather abstract. However, there are many tools and media for visualizations. For example, when teaching the phases of the moon, I always find it helpful to bring a ball painted in half white and half black to represent the bright and dark side of the moon, and

moving the “moon” around the students really help them visualize and thus understand the idea of moon phases.

2. Worksheets and in-class discussions: I found that many people (including myself) learn better when they think through the concepts themselves. Having some worksheets or guided questions in class help the students not just passively absorb the material, but actively trying to apply things they learn to solve problems, which keep them engaged and also easier to find out what they do not understand.

Besides the techniques mentioned above, it is also important to be flexible and adjust the teaching approach based on the students’ needs. I usually made some adjustments of my teaching methods after a few weeks into the semester when I know the students better. Moreover, I found that having office hours with an open door and welcoming atmosphere is very important, especially for students who have some problems catching up. I also learned from my teaching and mentoring experiences that it is important to not provide straight answers to students immediately, instead, it is better to guide students through problems, and make sure the student think for themselves. I believe that one of the most important things students learn from college education is independent and critical thinking, and the ability to find solutions on their own.

In addition, I firmly believe that embracing diversity is a key element to performing excellent science. Having significant experiences in two very different cultures (Taiwanese/Chinese and American), I especially understand the importance and difficulties in working with people that are different than yourself. Nonetheless, one thing I enjoy the most in the science community is that I can work with people with different backgrounds, personalities, cultures, ethnicities, nationalities, religions, genders,...etc. The diversity in this society truly helps me keep an open mind and being able to see things from different views, which I believe are essential for science. Therefore, I will make particular effort to ensure an environment that welcomes diversity, and all the students, regardless of their backgrounds, ethnicities, genders...etc, feel comfortable and encouraged in learning.

During my TA experiences, I generally received very positive student feedback, where students mentioned that I am easy to approach and enthusiastic about teaching. I also have very good experiences working with undergraduate interns while being a postdoctoral researcher at Goddard. I have mentored and co-mentored seven interns, who come from a wide variety of majors and backgrounds, and I adapt my mentoring/teaching approach for each student. It is my pleasure to see that all of them did very well during their internships. One student received the John Mather scholarship for his summer research and another student send me a thank you note mentioning his good internship experience. Several students have sought further opportunity to perform astronomy researches afterwards, and one student is applying for graduate school in astrophysics right now!

The mentoring experiences at Goddard remind me how much I miss having more opportunities to directly interact with students. I look forward to sharing my passion in astronomy and physics with students through teaching and mentoring at the Oberlin College.